

Section II. (REMARKS)**Acknowledgment of Finalization of Restriction Requirement**

The finalization of the restriction requirement in the September 15, 2006 Office Action (at page 2, paragraph 1 thereof) is acknowledged. Withdrawn claims 1-13 therefore have been correspondingly identified in the listing of claims in Section I hereof.

It is requested that such method claims 1-13 be rejoined with the apparatus claims 14-34 upon finding of allowable subject matter in such apparatus claims.

Amendment of Claim 14

Claim 14 has been amended herein to recite, *inter alia*,

“said computational module being adapted for coupling in signal processing, monitoring and control relationship with the electrochemical deposition system when said electrochemical deposition system is arranged with the wafer being plated constituting a cathode element of an electrochemical cell including said copper plating anode, and said computational module being arranged to process an electrode parameter of said wafer as said wafer-based independent variable in said regression analysis.”

Such recitation is fully consistent with and supported by the original disclosure of the application, e.g.,

- paragraph [0047] (“[T]he substrate (wafer) on which copper is being deposited is used as a cathode element of the electrochemical cell including the copper source anode as a reference electrode”),
- paragraph [0053] (“a wafer-based electrode parameter as the sampled variable for regression analysis”),
- paragraph [0054] (“utilizing the wafer being plated as an electrode component of electrochemical cell providing the sampled variable for regression analysis”), and

- the Abstract ("in which the workpiece being plated is utilized as an electrode component in the monitoring operation, thereby substantially simplifying the analytical monitoring metrology of ECD operation").

Accordingly, no new matter (35 USC 132) has been introduced.

Rejection of claims under 35 USC 103

In the September 15, 2006 Office Action, claims 14-34 have been rejected under 35 USC 103(a) as being unpatentable over Reid US Patent 6,458,262 ("Reid") in view of Etherington US Patent 6,231,743 ("Etherington").

Such rejection is traversed on the basis of the amendment to claim 14, from which all other pending claims under consideration, claims 15-34, are directly or indirectly dependent.

Neither Reid nor Etherington contains any disclosure or suggestion of a computational module and electrochemical deposition system, with

"said computational module being adapted for coupling in signal processing, monitoring and control relationship with the electrochemical deposition system when said electrochemical deposition system is arranged with the wafer being plated constituting a cathode element of an electrochemical cell including said copper plating anode, and said computational module being arranged to process an electrode parameter of said wafer as said wafer-based independent variable in said regression analysis."

The applicants' invention, as a result of such components and arrangements, "achieves a material simplification in the monitoring and control infrastructure that is required for the electrochemical deposition system" (paragraph [0053] at page 16 of the present application) and "conducts real-time monitoring reflecting conditions at the wafer" (paragraph [0054] at page 16 of the present application).

No derivative basis for the applicants' claimed invention as recited in amended claim 14 is present in either Reid or Etherington.

In fact, Etherington teaches away from the applicants' claimed invention, by a plating bath film deposition system "wherein the cathode, the anode, and the substrate are independent elements" (column 7, lines 44-45 of Etherington) and wherein a sensing unit formed as part of the plating system's diffuser plate is employed (column 2, lines 21-25 of Etherington).

Reid likewise contains no disclosure that is in any way indicative or suggestive of the applicants' claimed invention. Contrariwise, Reid discloses an arrangement in which an electrolyte sample "is obtained directly from a plating cell of the electroplating process, from a separate sampling vessel of the electroplating process, or from a central plating chemistry vessel" (column 3, lines 11-14 of Reid) as the basis of processing to enable control of the electrolyte path composition and plating hardware. Reid conducts a fractionation of such electrolyte sample, followed by a density determination, followed by a conductivity and/or light absorption determination, followed by a comparison to determine concentration of metal salt and acid components, as a basis for adjusting conditions of the electroplating process. Such methodology is in no way analogous to or suggestive of applicants' claimed invention as recited in claim 14, from which all remaining claims 15-34 either directly or indirectly depend.

Accordingly, it is requested that the rejection of claims 14-34 be withdrawn.

CONCLUSION

Based on the foregoing, claims 14-34 as amended herein are fully patentably delineated over the reference combination of Reid and Etherington. Accordingly, allowance of claims 14-34 is merited, and such action is respectfully requested.

In the event that prosecution can at any point be expedited by telephonic interaction with the undersigned attorney, the examiner is requested to contact such attorney at (919) 419-9350 so that any relevant issues can be promptly resolved, and patent issuance can be secured at an early date.

Respectfully submitted,



Steven J. Hultquist
Reg. No. 28,021
Attorney for Applicants

**INTELLECTUAL PROPERTY/
TECHNOLOGY LAW**
Phone: (919) 419-9350
Fax: (919) 419-9354
Attorney File No.: 2771-688 (7492)